```
=> d his


     (FILE 'HOME' ENTERED AT 10:36:56 ON 29 OCT 2002)

     INDEX 'ADISALERTS, ADISINSIGHT, ADISNEWS, AGRICOLA, ANABSTR, AQUASCI,
     BIOBUSINESS, BIOCOMMERCE, BIOSIS, BIOTECHABS, BIOTECHDS, BIOTECHNO,
CABA,
     CANCERLIT, CAPLUS, CEABA-VTB, CEN, CIN, CONFSCI, CROPB, CROPU, DDFB,
     DDFU, DGENE, DRUGB, DRUGLAUNCH, DRUGMONOG2, ...' ENTERED AT 10:37:10 ON
     29 OCT 2002
               SEA MANNANASE
               ---------
            193   FILE AGRICOLA
              3   FILE ANABSTR
             17   FILE AQUASCI
             77   FILE BIOBUSINESS
              3   FILE BIOCOMMERCE
            527   FILE BIOSIS
            258   FILE BIOTECHABS
            258   FILE BIOTECHDS
            188   FILE BIOTECHNO
            197   FILE CABA
            865   FILE CAPLUS
             84   FILE CEABA-VTB
              2   FILE CEN
              3   FILE CIN
             15   FILE CONFSCI
              3   FILE CROPB
             11   FILE CROPU
              3   FILE DDFB
              1   FILE DDFU
            226   FILE DGENE
              3   FILE DRUGB
              1   FILE DRUGU
              2   FILE EMBAL
            181   FILE EMBASE
            184   FILE ESBIOBASE
              8   FILE FEDRIP
             50   FILE FROSTI
            143   FILE FSTA
            144   FILE GENBANK
             71   FILE IFIPAT
             55   FILE JICST-EPLUS
            189   FILE LIFESCI
            172   FILE MEDLINE
              3   FILE NTIS
              3   FILE OCEAN
            228   FILE PASCAL
             10   FILE PROMT
            444   FILE SCISEARCH
             48   FILE TOXCENTER
            276   FILE USPATFULL
              4   FILE USPAT2
             16   FILE VETU
            128   FILE WPIDS
            128   FILE WPINDEX
L1             QUE MANNANASE
               ---------
```

FILE 'CAPLUS, BIOS[redacted] SCISEARCH, BIOTECHDS' ENTERED [redacted] 10:38:25 ON 29 OCT
2002

FILE 'PASCAL, CABA' ENTERED AT 10:38:37 ON 29 OCT 2002

L2	1	S L1 (P) (RELATIVE ACTIVITY OR RESIDUAL ACTIVITY)
L3	280	S L1 AND ACTIVITY
L4	25	S L3 AND (60%)
L5	20	DUP REM L4 (5 DUPLICATES REMOVED)

=> d l5 ibib ab 1-20

L5 ANSWER 1 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
ACCESSION NUMBER: 2002-0431300 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2002 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Thermostable and alkaline-tolerant cellulase-free xylanase produced by thermotolerant Streptomyces sp. Ab106
AUTHOR: TECHAPUN Charin; CHAROENRAT Thanakorn; POOSARAN Naiyatat; WATANABE Masanori; SASAKI Ken
CORPORATE SOURCE: Department of Biotechnology, Faculty of Agro-Industry,
Chiangmai University, Chiangmai 50100, Thailand; Materials Science and Engineering, Graduate School of Engineering, Hiroshima Kokusai Gakuin University, 6-20-1 Nakano, Akiku, Hiroshima 739-0321, Japan
SOURCE: Journal of bioscience and bioengineering, (2002), 93(4), 431-433, 12 refs.
ISSN: 1389-1723
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Japan
LANGUAGE: English
AVAILABILITY: INIST-8234, 354000101537660150
AB Cellulase-free xylanase was produced by Streptomyces sp. Ab106 using cane
bagasse as the substrate at 55.degree.C. Its maximum **activity** was 13 IU without cellulase and **mannanase activities**. Its profiles were investigated. Its optimum temperature and pH were **60**.degree.C and 6.0, respectively. More than 70% of its **activity** was remained at **60**.degree.C at pH 9. This enzyme was quite stable and exhibited an active of more than 70% for 144 h at **60**.degree.C, and of more than 80% for 144 h at 40.degree.C, pH 9. This thermo-tolerant and alkaline-tolerant xylanase can be used in the pulp bleaching process.

L5 ANSWER 2 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
DUPLICATE
ACCESSION NUMBER: 2002-0324357 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2002 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Production of .beta.-**Mannanase** and .beta.-mannosidase from Aspergillus awamori K4 and their properties
AUTHOR: KURAKAKE Masahiro; KOMAKI Toshiaki
CORPORATE SOURCE: Department of Applied Biological Science, Fukuyama University, Sanzou, Gakuenchou 1 banchi, Fukuyama, Hiroshima 729-0292, Japan
SOURCE: Current microbiology : (Print), (2001), 42(6), 377-380, 11 refs.
ISSN: 0343-8651 CODEN: CUMIDD
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-17631, 354000096520000010
AB .beta.-**Mannanase** and .beta.-mannosidase from Aspergillus

awamori K4 was produced by solid culture with coffee waste and wheat bran. The optimum composition for enzyme production was 40% coffee waste-
60% wheat bran. Two enzymes were partially purified. Optimum pH was about 5 for both enzymes, and optimum temperature was around 80.degree.C for .beta.-**Mannanase** and **60**-70.degree.C for .beta.-mannosidase. These enzymes produced some oligosaccharides from glucomannan and galactomannan by their hydrolyzing and transferring **activities**. .beta.-**Mannanase** hydrolyzed konjak and locust bean gum 39.1% and 15.8%, respectively. Oligosaccharides of various molecular size were released from glucomannan of konjak, but on the addition of cellulase, mannobiose was released selectively. In locust bean gum, tetra-, tri-, and disaccharides (mannobiose) were mainly released by K4 .beta.-**mannanase**. Tetra- and trisaccharides were heterooligosaccharides consisting of galactose and mannose residues. K4 .beta.-mannosidase had a transglycosylation action, transferring mannose residue to alcohols and sugars like fructose.

L5 ANSWER 3 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
ACCESSION NUMBER: 2001-0296406 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2001 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): A novel thermostable xylanase from Thermomonospora sp.
: influence of additives on thermostability
AUTHOR: GEORGE Sudeep P.; AHMAD Absar; RAO Mala B.
CORPORATE SOURCE: Division of Biochemical Sciences, National Chemical Laboratory, Pune 411008, India
SOURCE: Bioresource technology, (2001), 78(3), 221-224, 11 refs.
ISSN: 0960-8524
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-18769, 354000095248940010
AB An alkalothermophilic Thermomonospora sp. producing high levels of xylanase was isolated from self-heating compost. The culture produced 125 IU/ml of xylanase when grown in shake flasks at pH 9 and 50.degree.C for 96 h. The culture filtrate also contained cellulase (23 IU/ml), **mannanase** (1 IU/ml) and .beta.-xylosidase (0.1 IU/ml) **activities**. The xylanase was active at a broad range of pH (5-9) and temperature (40-90.degree.C). The optimum pH and temperature were 7 and 70.degree.C, respectively. The enzyme was stable in the pH range 5-8 and was thermostable with half-lives of 8 and 4 h at **60** .degree.C and 70.degree.C, respectively, but only 9 min at 80.degree.C. The effects of a variety of compounds to enhance the stability of xylanase at 80.degree.C was studied. Addition of sorbitol, mannitol and glycerol increased the thermostability of xylanase in proportion to the number of hydroxyl groups per polyol molecule. Glycine also offered protection against thermoinactivation. Xylan, trehalose, gelatin and trehalose-gelatin mixture had marginal effect on the thermostability of xylanase at 80.degree.C.

L5 ANSWER 4 OF 20 CABA COPYRIGHT 2002 CABI
ACCESSION NUMBER: 2001:83134 CABA
DOCUMENT NUMBER: 20013078189
TITLE: Production and properties of beta -**mannanase** by free and immobilized cells of Aspergillus oryzae NRRL 3488
AUTHOR: Hashem, A. M.; Ismail, A. M. S.; El-Refai, M. A.; Abdel-Fattah, A. F.
CORPORATE SOURCE: Department of Natural and Microbial Products

Chemistry, National Research Centre, Tahrir Street, Dokki, Cairo, Egypt.
SOURCE: Cytobios, (2001) Vol. 105, No. 409, pp. 115-130. 19 ref.
ISSN: 0011-4529
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Seven fungi (Aspergillus oryzae NRRL 3486, NRRL 3483, and NRLL 3488, A. terreus, Trichoderma viride NRRL 24631 and NRRL 24618 and T. ressei) were tested for production of **mannanases** [beta-mannosidase]. The highest **mannanase activities** were produced by A. oryzae NRRL 3488 after 7 days in static cultures. **Mannanases** were induced by gum locust bean (1.0%; a galactomannan from the seeds of Ceratonia siliqua). The highest **mannanase activity** was produced when a mixture of peptone, urea and ammonium sulfate was used as nitrogen source. Zn2+ or Co2+ favoured enzyme production. The immobilized cells on Ca-alginate and agar were able to produce beta -**mannanase** for four runs with a slight decrease in the **activity**. The optimum temperature for enzyme reaction was 50-55 deg C at pH 6.0. In the absence of substrate the enzyme was thermostable retaining 75% **activity** for 1 h at 50 deg C, and 68% **activity** for 1 h at **60** deg C.

L5 ANSWER 5 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED. DUPLICATE
ACCESSION NUMBER: 2000-0520583 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Purification and characterization of .beta.-**mannanase** from Bacillus licheniformis for industrial use
AUTHOR: JUN ZHANG; ZHIMIN HE; KUN HU
CORPORATE SOURCE: Laboratory of Enzyme Technology, Chemical Engineering Research Center, Tianjin University, Tianjin 300072, China
SOURCE: Biotechnology letters, (2000), 22(17), 1375-1378, 9 refs.
ISSN: 0141-5492 CODEN: BILED3
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-18225, 354000092226140050
AB An easily scaled-up technique has been designed to purify .beta.-**mannanase** from Bacillus licheniformis. Using flocculation, ultrafiltration and ion-exchange chromatography, the enzyme was purified 33-fold with a final recovery of 47% and a specific **activity** of 4341 U mg.sup.-.sup.1 protein. The enzyme had maximum **activity** at **60** .degree.C and pH 7.0. It was stable at 50 .degree.C and pH 6.0 for 6 h, but lost all of its **activity** when held at 70 .degree.C and pH 6.0 for I h.

L5 ANSWER 6 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
ACCESSION NUMBER: 2000-0380645 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): A highly thermostable endo-(1,4)-.beta.-**mannanase** from the marine bacterium Rhodothermus marinus
AUTHOR: POLITZ O.; KRAH M.; THOMSEN K. K.; BORRISS R.
CORPORATE SOURCE: Karl Kristian Thomsen Department of Physiology, Carlsberg Laboratory, Copenhagen, Denmark; AG Bakteriengenetik, Institute of Biology, Humboldt University of Berlin, Berlin, Germany, Federal Republic of
SOURCE: Applied microbiology and biotechnology, (2000), 53(6),

715-721, 34 refs.
ISSN: 0175-7598 CODEN: AMBIDG
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Germany, Federal Republic of
LANGUAGE: English
AVAILABILITY: INIST-16771, 354000089068520150
AB Rhodothermus marinus ATCC 43812, a thermophilic bacterium isolated from marine hot springs, possesses hydrolytic **activities** for depolymerising substrates such as carob-galactomannan. Screening of expression libraries identified **mannanase**-positive clones. Subsequently, the corresponding DNA sequences were determined, eventually identifying a coding sequence specifying a 997 amino acid residue protein of 113 kDa. Analyses revealed an N-terminal domain of unknown function and a C-terminal **mannanase** domain of 550 amino acid residues with homology to known **mannanases** of glycosidase family 26. Action pattern analysis categorised the R. marinus **mannanase** as an endo-acting enzyme with a requirement for at least five sugar moieties for effective catalytic **activity**. When expressed in Escherichia coli, purified gene product with catalytic **activity** was mainly found as two protein fragments of 45 kDa and 50 kDa. The full-length protein of 113 kDa was only detected in crude extracts of R. marinus, while truncated protein-containing fractions of the original source resulted in a major active protein of **60** kDa. Biochemical analysis of the **mannanase** revealed a temperature and pH optimum of 85 .degree.C and pH 5.4, respectively. Purified, E. coli-produced protein fragments showed high heat stability, retaining more than 70% and 25% of the initial **activity** after 1 h incubation at 70 .degree.C and 90 .degree.C, respectively. In contrast, R. marinus-derived protein retained 87% **activity** after 1 h at 90 .degree.C. The enzyme hydrolysed carob-galactomannan (locust bean gum) effectively and to a smaller extent guar gum, but not yeast mannan.

L5 ANSWER 7 OF 20 PASCAL
DUPLICATE
ACCESSION NUMBER: 2000-0457776 PASCAL

TITLE (IN ENGLISH): Optimisation of culture medium and conditions for .alpha.-L-arabinofuranosidase production by the extreme thermophilic eubacterium Rhodothermus marinus
AUTHOR: GOMES J.; GOMES I.; TERLER K.; GUBALA N.; DITZELMUELLER G.; STEINER W.
CORPORATE SOURCE: Institute for Biotechnology, Technical University Graz, Petersgasse 12, 8010 Graz, Austria; Holzforschung Austria, Franz-Grill Strasse 7, 1031 Vienna, Austria
SOURCE: Enzyme and microbial technology, (2000), 27(6), 414-422, 34 refs.
ISSN: 0141-0229 CODEN: EMTED2
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Ireland
LANGUAGE: English
AVAILABILITY: INIST-18233, 354000091003070090
AB The culture medium for Rhodothermus marinus was optimised on a shake-flask scale by using statistical factorial designs for enhanced production of a highly thermostable .alpha.-L-arabinofuranosidase (AFase). The medium containing 3.6 g/l birch wood xylan and 8.2 g/l yeast extract yielded a maximum of 110 nkat/ml AFase **activity**

together with 125 nkat/ml xylanase and 65 nkat/ml .beta.-xylosidase **activity**. In addition, low levels of .beta.-**mannanase** (30 nkat/ml), .alpha.-galactosidase (0.2 nkat/ml), .beta.-galactosidase (0.3 nkat/ml), endoglucanase (5 nkat/ml) and .beta.-glucosidase (30 nkat/ml) were detected in the culture filtrate. Among the various carbon sources tested, birchwood xylan was most effective for the formation of AFase and xylanase **activities**, followed by oat spelt and beechwood xylans, and xylan-rich lignocelluloses (e.g., starch-free sugar beet pulp and wheat bran). Constitutive levels of enzyme **activities** were detected when the bacterium was grown on other polysaccharides and low-molecular-weight carbohydrates. A fermentation in a 5-1 fermenter (3-1 working volume) using the optimised medium yielded **60** nkat/ml AFase associated with 65 nkat/ml xylanase and 35 nkat/ml .beta.-xylosidase **activities**. The crude AFase displayed optimal **activity** between pH 5.5 and 7 and at 85.degree.C. It had half-lives of 8.3 h at 85.degree.C and 17 min at 90.degree.C. It showed high stability between pH 5 and 9 (24 h at 65.degree.C). The combined use of AFase-rich xylanase and **mannanase** from R. marinus in the prebleaching of softwood kraft pulp gave a brightness increase of 1.8% ISO. To our knowledge, this is the first report on the production of a high AFase **activity** by an extreme thermophilic bacterium and this enzyme is the most thermostable AFase reported so far.

L5 ANSWER 8 OF 20 PASCAL
ACCESSION NUMBER: 2000-0042826 PASCAL

TITLE (IN ENGLISH): A family 26 **mannanase** produced by Clostridium thermocellum as a component of the cellulosome contains a domain which is conserved in **mannanases** from anaerobic fungi
AUTHOR: HALSTEAD J. R.; VERCOE P. E.; GILBERT H. J.; DAVIDSON K.; HAZLEWOOD G. P.
CORPORATE SOURCE: Laboratory of Molecular Enzymology, The Babraham Institute, Babraham, Cambridge CB2 4AT, United Kingdom; Department of Animal Science, University of Western Australia, Nedlands, WA 6009, Australia; Department of Biological and Nutritional Sciences, The University of Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU, United Kingdom
SOURCE: Microbiology : (Reading), (1999), 145(p.11), 3101-3108, 32 refs.
ISSN: 1350-0872
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-4410, 354000080516750100
AB Cellulosomes prepared by the cellulose affinity digestion method from Clostridium thermocellum culture supernatant hydrolysed carob galactomannan during incubation at **60** .degree.C and pH 6-5. A recombinant phage expressing **mannanase activity** was isolated from a library of C. thermocellum genomic DNA constructed in .lambda.ZAPII. The cloned fragment of DNA containing a putative **mannanase** gene (manA) was sequenced, revealing an ORF of 1767 nt, encoding a protein (**mannanase** A; Man26A) of 589 aa with a molecular mass of 66816 Da. The putative catalytic domain (CD) of Man26A, identified by gene sectioning and sequence comparisons, displayed up to 32% identity with other **mannanases** belonging to family 26. Immediately downstream of the CD and separated from it by a short proline/threonine linker was a duplicated 24-residue dockerin motif,

which is conserved in all C. thermocellum cellulosomal enzymes described thus far and medi[redacted]s their attachment to the cell[redacted]some-integrating protein (CipA). M[redacted]6A consisting of the CD alone [redacted]n26A') was hyperexpressed in Escherichia coli BL21(DE3) and purified. The truncated enzyme hydrolysed soluble and insoluble mannan, displaying a temperature optimum of 65 .degree.C and a pH optimum of 6-5, but exhibited no **activity** against other plant cell wall polysaccharides. Antiserum raised against Man26A' cross-reacted with a polypeptide with a molecular mass of 70000 Da that is part of the C. thermocellum cellulosome. A second variant of Man26A containing the N-terminal segment of 130 residues and the CD (Man26A") bound to ivory-nut mannan and weakly to soluble Carob galactomannan and insoluble cellulose. Man26A' consisting of the CD alone did not bind to these polysaccharides. These results indicate that the N-terminal 130 residues of mature Man26A may constitute a weak mannan-binding domain. Sequence comparisons revealed a lack of identity between this region of Man26A and other polysaccharide-binding domains, but significant identity with a region conserved in the three family 26 **mannanases** from the anaerobic fungus Piromyces equi.

L5 ANSWER 9 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
ACCESSION NUMBER: 1999-0535440 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1999 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Production of halostable .beta.-**mannanase** and .beta.-mannosidase by strain NN, a new extremely halotolerant bacterium
AUTHOR: WAINO M.; INGVORSEN K.
CORPORATE SOURCE: Institute of Biological Sciences, Department of Microbial Ecology, Ny Munkegade, Building 540, 8000 Arhus C, Denmark
SOURCE: Applied microbiology and biotechnology, (1999), 52(5), 675-680, 21 refs.
ISSN: 0175-7598 CODEN: AMBIDG
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Germany, Federal Republic of
LANGUAGE: English
AVAILABILITY: INIST-16771, 354000080300830100
AB An extremely halotolerant mannan-degrading bacterium (strain NN) was isolated from the Great Salt Lake, Utah, USA. Strain NN grew at salinities from 0 to 20% NaCI with optimal growth at 0% NaCI. When grown on 0.2% (w/v) locust bean gum as the carbon source at 10% NaCl, both .beta.-**mannanase** and .beta.-mannosidase **activities** were produced. .beta.-Mannosidase **activity** was shown to be cell-associated, while at least 23% of the total .beta.-**mannanase** **activity** was extracellular. The optimum temperature and pH for .beta.-**mannanase** **activity** were 70.degree.C and 7.6, and for .beta.-mannosidase 25.degree.C and 7.0. The .beta.-**mannanase** system retained full **activity** after 24 h of incubation at **60** .degree.C and 10% NaCl. .beta.-**Mannanase** **activity** was maximal at 1% NaCl and .beta.-mannosidase **activity** at 0.5% NaCI. Despite these low salinity optima, 50% and 100% respectively of the initial .beta.-**mannanase** and .beta.-mannosidase **activities** remained after 48 h of incubation at 20% NaCI, indicating a high degree of halostability. Sodium dodecyl sulphate/polyacrylamide gel electrophoresis revealed the presence of at least eight different mannan-degrading proteins in the cell-free culture supernatant of cultures grown on locust bean gum.

L5 ANSWER 10 OF 20 CABA COPYRIGHT 2002 CABI
ACCESSION NUMBER: 2000:152324 CABA

DOCUMENT NUMBER: 20001420276
TITLE: Nutritive value of palm oil sludge fermented with Aspergillus niger after thermal drying process
Evaluasi nilai gizi lumpur sawit fermentasi dengan Aspergillus niger setelah proses pengeringan dengan pemanasan
AUTHOR: Purwadaria, T.; Sinurat, A. P.; Supriyati; Hamid, H.; Bintang, I. A. K.
CORPORATE SOURCE: Balai Penelitian Ternak, PO Box 221, Bogor 16002, Indonesia.
SOURCE: Jurnal Ilmu Ternak dan Veteriner, (1999) Vol. 4, No.
4, pp. 257-263. 21 ref.
DOCUMENT TYPE: Journal
LANGUAGE: Indonesian
SUMMARY LANGUAGE: English

AB Solid substrate fermentation by Aspergillus niger was carried out to improve the nutritive value of palm oil sludge (POS). POS was fermented aerobically for 4 days in fermentation chambers (28 deg C, RH 80%), with **60%** moisture content. Some of the product was further incubated anaerobically for 2 days at 28 deg . Both products from aerobic and anaerobic fermentation processes were dried by various methods, sunlight, oven at **60** deg , oven with blower at 40 deg , until a moisture content of less than 11% was achieved. Results of the drying methods were also compared with the fresh fermented product. There was no interaction between type of fermentation process (aerobic or anaerobic) and drying method (fresh, sunlight, oven **60** deg or blower 40 deg) for almost all parameters except total alpha -amino acid content. Significant results (P<0.05) were obtained with drying method for CP, true protein, in vitro DM and protein digestibility, and **mannanase** and cellulase **activities**. There were no significant differences between treatments with respect to crude fibre analysis and soluble nitrogen content. No significant differences were observed between aerobic and anaerobic fermentation processes for almost all parameters except for DM digestibility. Results from true protein and in vitro digestibility show that the fresh fermented product has the best nutritive value, while product dried by sunlight was the best. Results from in vivo protein and energy digestibility show better ME and protein for products subjected to the aerobic process and oven and blower treatments, while sunlight drying was best for products processed under anaerobic conditions. Although fresh fermented products gave better results on the basis of in vitro digestibility and enzyme **activity** analyses, sunlight drying gave best results for products processed under anaerobic conditions.

L5 ANSWER 11 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
DUPLICATE
ACCESSION NUMBER: 1998-0277163 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1998 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Characterization of galactosidases from Aspergillus niger: purification of a novel .alpha.-galactosidase **activity**
AUTHOR: MANZANARES P.; DE GRAAFF L. H.; VISSER J.
CORPORATE SOURCE: Section Molecular Genetics of Industrial Microorganisms, Wageningen Agricultural University, Wageningen, Netherlands
SOURCE: Enzyme and microbial technology, (1998), 22(5), 383-390, 43 refs.
ISSN: 0141-0229 CODEN: EMTED2
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-18233, 354000075564840130

AB An enzyme with .beta.-galactosidase **activity** and three proteins exhibiting .alpha.-galactosidase **activity** were purified from a culture filtrate of Aspergillus niger grown on arabinoxylan. .beta.-galactosidase, optimally active at pH 4 and **60** -65.degree.C, was active against p-nitrophenyl-.beta.-D-galactopyranoside, lactose, and pectic galactan. It was not able to release galactose from sugar beet pectin or lemon pectin. Its action on pectic galactan was increased by the presence of .beta.-galactanase. The three forms of .alpha.-galactosidase **activity** that showed different molecular masses and pls were found to have the same mass after deglycosylation with N-glycanase F and to be the same protein based on their N-terminal amino acid sequence data. The purified .alpha.-galactosidase was shown to be different from .alpha.-galactosidase A from A. niger. This confirmed the existence of at least two different .alpha.-galactosidases in A. niger. .alpha.-Galactosidase, optimally active at pH 4.5 and 50-55.degree.C, was active toward p-nitrophenyl-.alpha.-D-galactopyranoside, melibiose, raffinose, stachyose, and locust bean gum, on which substrate it exhibited synergism with .beta.-**mannanase**.

L5 ANSWER 12 OF 20 CABA COPYRIGHT 2002 CABI
ACCESSION NUMBER: 1999:148331 CABA
DOCUMENT NUMBER: 991412331
TITLE: The correlation between **mannanase** and cellulase **activities** towards fibre content of palm oil sludge fermented with Aspergillus niger
Korelasi antara aktivitas enzim mananase dan selulase terhadap kadar serat lumpur sawit hasil fermentasi dengan Aspergillus niger
AUTHOR: Purwadaria, T.; Sinurat, A. P.; Haryati, T.; Sutikno, I.; Supriyati; Darma, J.
CORPORATE SOURCE: Balai Penelitian Ternak, P.O. Box 221, Bogor 16002, Indonesia.
SOURCE: Jurnal Ilmu Ternak dan Veteriner, (1998) Vol. 3, No. 4, pp. 230-236. 24 ref.
DOCUMENT TYPE: Journal
LANGUAGE: Indonesian
SUMMARY LANGUAGE: English
AB Enzyme (**mannanase** and cellulase) **activities** and fibre (hemicellulose, cellulose and lignin) contents were determined during the fermentation course of palm oil sludge with A. niger TL (wild type) and A. niger ES1 (an asporogenous mutant). The analyses were carried out at the incubation time of 3 and 4 days of aerobic fermentation and at 2 days of anaerobic fermentation afterward. The correlations between **mannanase activity** with hemicellulose content and cellulase **activity** with cellulose content were calculated by linear regression. The **activities** of **mannanase** and cellulase are increasing during the aerobic fermentation, while in the anaerobic fermentation the enzyme **activities** are decreasing due to instability of the enzymes. The enzyme **activities** of ES1 are higher than the TL. The regression coefficient is highly significant for correlation between **mannanase** and hemicellulose content of fermented product by ES1 ($r=0.83$; $P<0.01$). **Mannanase** and cellulase **activities** were also detected after the fermented product dried at **60** deg C which indicated the enzymes are quite stable.

L5 ANSWER 13 OF 20 CABA COPYRIGHT 2002 CABI
ACCESSION NUMBER: 1999:148330 CABA
DOCUMENT NUMBER: 991412330
TITLE: The effect of fermentor temperatures and moisture content of substrate on the nutritive value of

fermented palm oil sludge
Pengaruh suhu ruang fermentasi dan kadar air substrat terhadap nilai gizi produk fermentasi lumpur sawit
AUTHOR: Sinurat, A. P.; Purwadaria, T.; Rosida, J.; Surachman, H.; Hamid, H.; Kompiang, I. P.
CORPORATE SOURCE: Balai Penelitian Ternak, P.O. Box 221, Bogor 16002, Indonesia.
SOURCE: Jurnal Ilmu Ternak dan Veteriner, (1998) Vol. 3, No. 4, pp. 225-229. 17 ref.
DOCUMENT TYPE: Journal
LANGUAGE: Indonesian
SUMMARY LANGUAGE: English

AB A series of experiment was designed to improve the nutritive value of palm oil sludge (POS) through fermentation. POS was fermented in a fermentor chamber with different temperatures (28 and 32 deg C) and initial moisture content of the substrate (50, 55 and **60%**). The nutrient content (CP, true protein, in vitro DM and protein digestibility and crude fibre) of the fermented products were evaluated at different stages of the fermentation, i.e.: before incubation (F0), 3 days after aerobic incubation (F3) and 2 days anaerobic incubation after F3 (EN). Cellulase and **mannanase activity** of the EN products were also measured before and after dried at **60** deg C. Fermentation at 32 deg C produced better product (higher nutritive values), although in vitro DM digestibility was not affected by temperature. All parameters measured were not significantly influenced by the initial moisture content of the substrate. The nutritive value of unincubated POS (F0) was significantly poorer than the F3 and EN and there was no different in nutrient value between F3 and EN. Soluble N and in vitro DM digestibility were not significantly affected by the stages of the fermentation. **Mannanase activity** in the EN product was significantly higher when the fermentation was performed at 32 deg C than those at 28 deg C and the enzyme **activity** was reduced after dried (320.7 vs 201.8 U/g DM). The cellulase **activity** of the fresh/wet fermented product produced at 28 deg C was significantly higher than those produced at 32 deg C, but the reverse was occurred in the dry products. It is concluded that fermentation process of palm oil sludge at 32 deg C and initial moisture content of 50-**60%** produced better (in vitro) nutritive value.

L5 ANSWER 14 OF 20 PASCAL
DUPLICATE
ACCESSION NUMBER: 1998-0132095 PASCAL

TITLE (IN ENGLISH): Substrate specificities of Penicillium simplicissimum .alpha.-galactosidases
AUTHOR: LUONTERI E.; TENKANEN M.; VIIKARI L.
CORPORATE SOURCE: VTT Biotechnology and Food Research, Espoo, Finland
SOURCE: Enzyme and microbial technology, (1998), 22(3), 192-198, 33 refs.
ISSN: 0141-0229 CODEN: EMTED2
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-18233, 354000078262420090

AB The substrate specificities of three Penicillium simplicissimum .alpha.-galactosidases, AGLI, AGLII, and AGLIII were determined by using various isolated galactose-containing oligosaccharides and polymeric galacto(gluco)mannans. AGLI released galactose from melibiose and raffinose-family oligosaccharides but the amount of galactose released

was decreased from 96% to 35% by the increasing chain lenght of the substrate from raffinose to verbascose. It was able to release galactose linked to the nonreducing end and less efficiently to the internal residues of the galactomanno-oligomers. AGLI was able to hydrolyze 60-92% of galactose from polymeric galacto(gluco)mannans alone but its action was facilitated by **mannanase** and .beta.-mannosidase. In addition, it was able to release about 10% of the galactose from softwood kraft pulp alone and about 22% in combination with **mannanase**. AGLII was highly specific toward small galactose-containing oligosaccharides in which the galactose is linked to the nonreducing enf of the substrate. It released 90-100% of galactose present in melibiose, raffinose, stachyose, and verbascose; however, it was able to degrate polymeric substrates only in combination with **mannanase** and .beta.-mannosidase. AGLII had only low **activity** toward the oligomeric substrates tested. It was able to release some galactose from the polymeric galacto(gluco)mannans alone, but its action was clearly enhanced by the backbone degrading enzymes.

L5 ANSWER 15 OF 20 PASCAL
ACCESSION NUMBER: 1998-0233732 PASCAL
COPYRIGHT NOTICE:
TITLE (IN ENGLISH): Purification and characterization of an endo-1,4-.beta.-**mannanase** from Bacillus subtilis KU-1
AUTHOR: ZAKARIA M. M.; YAMAMOTO S.; YAGI T.
CORPORATE SOURCE: Department of Bioresources Science, Faculty of Agriculture Kochi University, Monobe B-200, Nankoku City, Kochi 783, Japan
SOURCE: FEMS microbiology letters, (1998), 158(1), 25-31
ISSN: 0378-1097 CODEN: FMLED7
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Netherlands
LANGUAGE: English
SUMMARY LANGUAGE: English
AVAILABILITY: INIST-17567A, 354000075090790008
AB Endo-1,4-.beta.-**mannanase** was purified to homogeneity from the culture supernatant of Bacillus subtilis KU-1 by ammonium sulfate precipitation, DEAE-Toyopearl, phenyl-Sepharose and FPLC Mono Q column chromatography by 810-fold with 39% yield. The molecular mass of the enzyme was estimated to be 39 kDa by SDS-PAGE and 40 kDa by gel filtration. It had a pI of 4.5 with maximum **activity** at pH 7.0 and 50-55.degree.C. It was stable for 48 h between pH 4.5 and 9.0, and for 1 h up to 60.degree.C. The enzyme **activity** was strongly inhibited by Hg.sup.2.sup.+, Ag.sup.2.sup.+, Cu.sup.2.sup.+, Mn.sup.2.sup.+, and Cr.sup.2.sup.+. The amino acid composition of the enzyme was in the order Asx>Glx>Leu>Try>Ser.

L5 ANSWER 16 OF 20 PASCAL
ACCESSION NUMBER: 1996-0137351 PASCAL
COPYRIGHT NOTICE:
TITLE (IN ENGLISH): Multiple forms of .beta.-**mannanase** from Bacillus sp. KK01
AUTHOR: HOSSAIN M. Z.; ABE J.-I.; HIZUKURI S.
CORPORATE SOURCE: Kagoshima univ., fac. agriculture, dep. biochemical sci. technology, Korimoto 1-21-24, Kagoshima 890, Japan
SOURCE: Enzyme and microbial technology, (1996), 18(2), 95-98,
21 refs.

ISSN: 0141-0229 CODEN: EMTED2
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-18233, 354000052803920030
AB Bacillus sp. KK01, which was isolated from soil, produced .beta.-**mannanase** about 2 U ml.sup.-.sup.1 in culture medium. By DEAE-ion exchange column chromatography, four enzyme components F1, F2, F3, and F4 were separated. All components showed maximum **activity** at pH 7.1. F1 showed maximum **activity** at **60**.degree.C, which was 5-10.degree.C higher than those of the rest. The four components F1, F2, F3, and F4 hydrolyzed copra mannan to the extent of 23-31% ; yielded mannobiose, mannotriose, and mannotetraose as hydrolysis products ; and also hydrolyzed locust bean gum to the extent of 19-22%, giving similar products.

L5 ANSWER 17 OF 20 PASCAL COPYRIGHT 2002 INIST-CNRS. ALL RIGHTS RESERVED.
ACCESSION NUMBER: 1995-0402804 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1995 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Purification and some properties of .beta.-**mannanase** from Bacillus sp
AUTHOR: OOI T.; KIKUCHI D.
CORPORATE SOURCE: Utsunomiya univ., fac. agriculture, dep. bioproductive sci., Utsunomiya Tochigi 321, Japan
SOURCE: World journal of microbiology & biotechnology, (1995), 11(3), 310-314, 10 refs.
ISSN: 0959-3993
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-21001, 354000050958990130
AB .beta.-**Mannanase** (EC 3.2.1.78) produced by Bacillus sp. W-2, isolated from decayed commercial konjak cake, was purified from the culture supernatant by (NH.sub.4).sub.2SO.sub.4 precipitation, adsorption to konjak gel, and column chromatography with DEAE-cellulose, Sephadex G-100 and Sephacryl S-200. Its molecular size was estimated by SDS-PAGE as 40 kDa, and by gel filtration as 36 kDa. The enzyme was most active at pH 7 and 70.degree.C and was stable for at least 1 h between pH 5 and 10 and below **60**.degree.C. Its **activity** was completely inhibited by Hg.sup.2.sup.+. The enzyme hydrolysed galactomannan better than glucomannan and mainly produced mannose and mannobiose

L5 ANSWER 18 OF 20 CABA COPYRIGHT 2002 CABI
ACCESSION NUMBER: 95:143217 CABA
DOCUMENT NUMBER: 951301882
TITLE: Isolation of mannan-utilizing bacteria and the culture conditions for **mannanase** production
AUTHOR: Mendoza, N. S.; Arai, M.; Kawaguchi, T.; Cubol, F. S.; Panerio, E. G.; Yoshida, T.; Joson, L. M.
CORPORATE SOURCE: Industrial Technology Development Institute, Department of Science and Technology, Manila, Philippines.
SOURCE: World Journal of Microbiology & Biotechnology, (1994) Vol. 10, No. 1, pp. 51-54. 7 ref.
ISSN: 0959-3993
DOCUMENT TYPE: Journal
LANGUAGE: English

AB A locally isolated str., Bacillus subtilis NM-39, was selected as an active mannan-utilizing bacterium based on high saccharifying **activities** on coconut residue and locust bean gum galactomannan. The opt. pH and temp. ranges for **activity** of the crude enzyme were 5.0 t 6.0 and 50 to **60** deg C, resp. The organism gave max. **mannanase activity** when grown in liquid mineral salts medium containing 1% (w/v) each of coconut residue and soybean flour, as carbon and nitrogen sources, resp., at pH 7.0 and in aerobic growth for 28 h at 37 deg C. High saccharifying **activity** on coconut mannan was also observed.

L5 ANSWER 19 OF 20 PASCAL
ACCESSION NUMBER: 1993-0421306 PASCAL
TITLE (IN ENGLISH): Purification, and characterization of a .beta.-**mannanase** of Trichoderma reesei C-30
AUTHOR: ARISAN-ATAC I.; HODITS R.; KRISTUFEK D.; KUBICEK C. P.
CORPORATE SOURCE: TU Wien, Inst. Biochemische Technologie Mikrobiologie, Abt. Mikrobielle Biochemie, 1060 Vienna, Austria
SOURCE: Applied microbiology and biotechnology, (1993), 39(1), 58-62, 24 refs.
ISSN: 0175-7598 CODEN: AMBIDG
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Germany, Federal Republic of
LANGUAGE: English
AVAILABILITY: INIST-16771, 354000035774270120
AB Trichoderma reesei was studied for its ability to produce .beta.-**mannanase** (EC 3.2.1.78) **activity** on a variety of carbon sources. The highest .beta.-**mannanase activity** was produced on cellulose, whereas .beta.-mannan-containing carbon sources (such as konjac powder or locust bean gum) gave lower enzyme titres. The enzyme responsible for the major .beta.-mannanolytic **activity** from T. reesei was purified to physical homogeneity by preparative chromatofocusing and anion exchange fast protein liquid chromatography. This .beta.-**mannanase** is a glycoprotein, with a molecular mass of 46 (.+-.2) kDa and an isoelectric point of 5.2. It has an optimal pH at 5.0 and broad pH stability (2.5-7.0). It is stable for **60** min at 55.sup.oC, and has an optimal temperature for **activity** at 75.sup.oC

L5 ANSWER 20 OF 20 CABA
ACCESSION NUMBER: 76:11569 CABA
DOCUMENT NUMBER: 750338312
TITLE: Enzyme to break down lettuce endosperm cell wall during gibberellin- and light-induced germination
AUTHOR: Halmer, P.; Bewley, J. D.; Thorpe, T. A.
CORPORATE SOURCE: Calgary University, Calgary, Alberta T2 1N4, Canada.
SOURCE: Nature, UK, (1975) Vol. 258, No. 5537, pp. 716-718. 14 ref.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The sugars contents of lettuce seeds, cotyledons, radicles and endosperm and of 1-day-old seedlings were examined; the endosperm contained about **60%** mannose. This indicates that the endosperm cell walls largely comprise a mannan assumed to be linear beta -1,4 mannan. In a further experiment to study the breakdown of lettuce endosperm wall, endo- beta -**mannanase activity** was demonstrated in both light- and gibberellin-induced germination. This was correlated with the degree of germination as measured by radicle protrusion.